



Morris County Radio Communications for Police

JUNE 2021



GOALS & OBJECTIVES

- Motorola Radio Operation
- Local radio communications
- General radio usage
- County Radio System background
- Mutual Aid communications



MOTOROLA RADIO OPERATION



- UHF/700 Dual Band “Phase II” (TDMA) Trunked Radio System Radios
- Mobile Unit = APX8500
- Portable Radio = APX8000
- Capable of Transmitting in Digital or Analog format.
- Both have dual capability to RECEIVE Digital and Analog transmissions.
- Narrow Band operation complies with FCC rules for 1/1/2013



TURNING THE MOBILE RADIO ON/OFF

- To turn the radio on, push the power button
- Adjust volume knob (left side) clockwise to the desired volume setting.
- Wait for the radio to affiliate with the system.
- To turn the radio off, push the power button
- Most should be wired to turn on/off with vehicle ignition





SELECTING A TALK GROUP/CHANNEL

To select a talkgroup, simply turn the right hand knob (mode knob).






CHANGING ZONES



Use Zone UP	Use Zone menu	Use Zone Down
Increase 1 at a time	Select menu to scroll through all zones	Decrease 1 at a time



TRANSMITTING AND RECEIVING

- To transmit, press Push to Talk button.
- **Wait for permission to talk tone!** 
- Begin transmitting your message.
- When completed, release the Push to Talk button.



TRANSMITTING AND RECEIVING

- If the system is busy, you will hear a tone indicating that you are unable to transmit.



- Your transmission is placed into the “busy queue” in the order that it is received.
- When the system is available, you will hear the permission to talk tone.



HOME BUTTON

- Pressing the Home button will automatically switch your radio to your “Primary zone”, channel 1
- You can program your own using the “P” button





SCAN FEATURE

- To activate or deactivate the scan feature, simply push the scan button.
- Scans selected channel, and others user selected





SCAN FEATURE

- Program your own scan list
- Select 3rd buttons menu page
- Select SCNL
- Navigate to channel you want in scan
- Choose SEL
- Continue for additional channels
- Push HOME to exit scan list program mode





RECORDING FEATURE

- Press and hold orange button to record past 30 seconds of transmissions
- Press once to playback stored recording





DISPLAY BRIGHTNESS

- You can adjust the display brightness by pressing the “Dim” button until the desired brightness is achieved.





MOBILE RADIO BUTTONS





PORTABLE RADIO OPERATION







Buttons and Controls			
Index	Description	Conventional	Trunking
1		Power/Volume	Power/Volume
2	Two Position Concentric		
	Position A	Blank	Blank
	Position B	Scan	Scan
3	Three Position Toggle		
	Position A	Blank	Blank
	Position B	Keypad/ Controls Lock	Keypad/ Controls Lock
	Position C	Scan List Prgm	Scan List Prgm
4	Rotary Control	Channel/Sub Select	Channel/Sub Select
5	Top Button	Emergency	Emergency
6	Side Top Button	Nuisance Delete	Nuisance Delete
7	Side Middle Button	Audio Playback	Audio Playback
8	Side Bottom Button	Light/Flip	Light/Flip

There is no keypad on the radios provided



PORTABLE RADIO SCREEN

Display Status Symbols

	Battery <ul style="list-style-type: none">• Conventional = Blinks when the battery is low.• Smart = The number of bars (0-3) shown indicates the charge remaining in your battery.
	Talkaround. You are talking directly to another radio or through a repeater; On = direct; Off = repeater
	Monitor (Carrier Squelch). This channel is being monitored.
	Scan. The radio is scanning a scan list.



MAINTENANCE

Years ago, it was required by the FCC that all RF radio equipment be evaluated every year. With that, the term Preventative Maintenance evolved. Older radios were crystal controlled and the crystals had a tendency to drift and go off frequency. With the frequency drifting up or down, the chances of interfering with your adjacent neighbor in the RF Band became an issue.

In today's world, we use circuits such as Phase Lock Loop or PLL circuits that keep the frequency locked on the channel. Drift is less common, but still occurs and is crucial in P25 systems such as Morris County's. We recommend that your equipment be serviced on a periodic basis.

Battery life is about 5 years on portables

FOUR (4) DIGIT BATTERY DATE CODE FORMAT (2011 & LATER): Battery Date Code Format: Y Y W W I I I I - Year of Battery Manufacture (1st and 2nd position of battery code)

11 = 2011 12 = 2012 21 = 2021

13 = 2013 14 = 2014

15 = 2015 16 = 2016

17 = 2017 18 = 2018

19 = 2019 20 = 2020

THREE (3) DIGIT BATTERY DATE CODE FORMAT (2011 & BEFORE): Battery Date Code Format: Y W W I I I I

0 = 2010 (could also mean year 2000)

1 = 2011



VIDEO TRAINING

See related operational and usage videos for:

- Scan list programming
- Dynamic zone programming

at

<https://www.morriscountynj.gov/Departments/Communication-Center/Training-Guides>



RADIO GENERAL USAGE INFORMATION



PROPER USAGE

- Using the “IAFC Best Practices” transmit audio quality and intelligibility improves significantly.
- Keys for improvement
 - The position and angle of the radio microphone
 - ❖ Holding the radio microphone 1-2 inches directly in front of the mouth (*IAFC Best Practice, Section 1, Recommendation 2*)
 - The volume level and clarity of voice
 - ❖ Speaking in a loud (not shouting), clear voice produces the best transmit audio quality and intelligibility (*IAFC Best Practice, Section 1, Recommendation 3*)
 - ❖ Minimize background (i.e. sirens, pump/engine noise)



Adobe Acrobat
Document



PROPER USAGE

- All Must comply with NIMS
- Use only “Clear text”/Plain Language – NO TEN CODES
- Dispatch center is “COUNTY”
- Vehicle ids – Town ORI#, unit #



PROPER USAGE

- **Short-Specific** - Before transmitting, know what you are going to say; don't make it up as you go along. Choose precise terms to communicate the desired message as clearly and briefly as possible without wasting airtime.
- **Pause Slightly Before Speaking** - Once you "key" the transmitter (push the transmit button), PAUSE one second before speaking. This ensures that you do not begin speaking before the radio is ready electronically to transmit your message and receiving units are ready to hear your message.
- **Indicate Objective** - Assignments should indicate an objective to the action. The officer(s) should know exactly where to go, whom to contact, and what the problem is. Officers should be specific about where they are, address, cross street, direction of travel, and what assistance/resource is needed.
- **Clear Tone -- Self Control -- Effective Rate** - Speak clearly at a practiced rate, not too fast or too slow. Deliberately control your emotions and excitement. If you do not consciously control your voice, it will become garbled under stress.
- **Well Timed/Spaced** - Prioritize your messages. Do not use up valuable airtime with unimportant messages and insignificant details. Let critical messages go first. Maintain an awareness of the overall situation and how you fit into it. Do not interrupt conversations unless you have EMERGENCY TRAFFIC. Listen before transmitting and wait until a message transaction has been completed. Pause between consecutive or lengthy messages ('break'). This will make it clear when one has been completed and another message started, or that there is more information to follow. It will give other units a chance to get on the air with important messages.



POLICE & TACTICAL TALK GROUPS

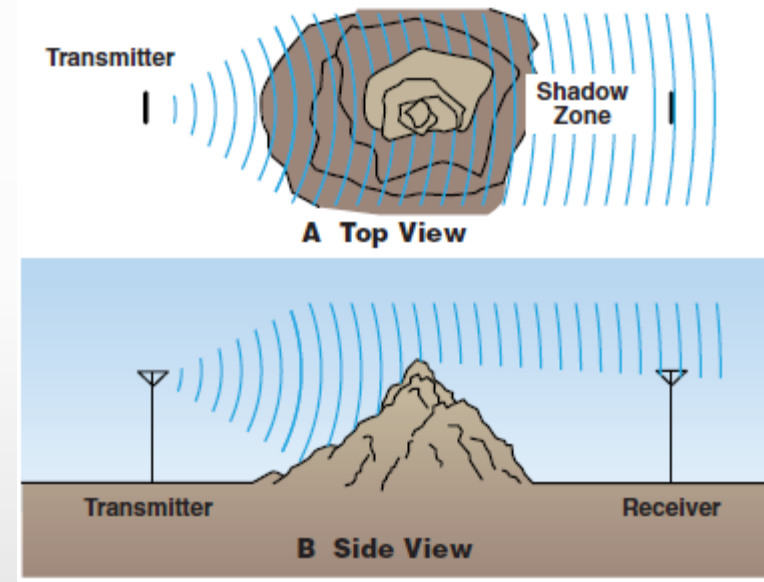
- Used by Incident Commander to coordinate incoming units
- Used to communicate with dispatcher
- Utilizes “trunked radio system” to transmit via repeaters and computers
- Could be limited for inside communications
 - Basements
 - Steel/concrete structures
 - Even with “Permission to talk” tone, is your digital message getting through?



USING TRUNKED CHANNEL INSIDE

Could be limited because:

Radio waves can travel through some materials, such as glass or thin wood, but the strength is reduced due to absorption as they travel through. Materials such as metal and earth completely block the waves due to their composition and density. In addition, some materials will reflect radio waves, effectively blocking the signal to the other side.





KEEP IN MIND...

- If a microphone is keyed (stuck open) no one else can get through or interrupt
- The distance the signal must travel to the repeater may be beyond the reach of your low wattage portable radio from inside a structure or below grade
- Weather conditions could affect the operation of the digital trunked radio system



USE OF DIRECT CHANNELS ON SCENE

- Direct unit to unit (analog-simplex mode)
- Everyone on scene can hear you
- In many cases, stuck open mike can be transmitted over
- Police DIRECT is available
- Short distance (< 1 mile) so can be reused throughout County
- No permission required for use
- In EVERY County Police radio



SPECIAL CHANNEL REQUESTS

Long Distance vs. Short Distance

For repeated/wide area requests, Tactical channels may be assigned by the dispatcher based on discipline. These can also be made available for planned events. UTAC44, 45, 46, 47, 48 are also available (UHF Bank A2), but require permission from UASI Central as well.

“ALL RADIOS” is present in ALL county radios including non-public safety if communication is required with other county services.

For local area needs, (approx. 1 mile or less) users do not necessarily require coordination, since range is limited.

- Police DIRECT.
- For cross discipline, **ALL-IOP**. (UHF Zone B2 channel 16)
- UTAC41-48 talkaround (UHF Bank B2) are also available.
- Federal and state tactical channels are also available in the “Federal” and “State” zones, but must be coordinated

While there are over 100 talkgroups on the Morris County system, not all are active and all/any are still constrained to using the same 10 frequencies in the system. So adding more active talkgroups does not alleviate congestion but may actually increase it, resulting in busy signals.



TRANSMITTING ON THE COUNTY SYSTEM

- When you push the Transmit key a “Chirp” type sound will be heard.
- Wait until after this tone is complete, then begin speaking. This tone is the radio connecting with the repeater.
- If you speak immediately and do not wait for the “Chirp” to complete, part of your message will be cut out.
- If you hear a “BUZZ” type sound, you cannot connect with a repeater, and therefore cannot transmit. Either because you are out of range, or because someone else was transmitting at the exact same time. Wait a few seconds or move a short distance (as little as across the street) then try transmitting again.





TALK GROUP (CHANNEL) CONFIGURATION

- Municipal/Local & County talk group programming is slightly different for Police, Fire & EMS agencies.
- But, all Emergency Services have similar, common programming, for easier interoperability between all agencies. PS Tactical and State and Federal channels are common.
- To communicate between any Municipality, whether dispatched by County or not, you must use the appropriate Talk Group assigned by the communications center for the incident.
- LE & PS tactical talk groups can ONLY be assigned by the comm. center. Agencies can NOT freelance to any talk group without County permission.



CHANNEL PROGRAMMING

- All radios by service are identical regardless if dispatched by county or not
- Extended or major operations will always be assigned a common tactical channel.
- Larger events will utilize the “host’s” primary channel to simplify operation for the host
- Other regular users of the same primary channel will be moved for their incidents if they occur



CHANNEL LAYOUT (PAGE 1)

ZONE/BANK

* = these zones will be decommissioned in 2022

	UHF A1*		UHF B1*		UHF C1*		UHF A2		UHF B2		DYNAMIC User programmable
1	POLICE 1		OPS 10		POLICE SECURE1		UCALL40-RP		UCALL40-TA		
2	POLICE 2		OPS 11		POLICE SECURE2		UTAC41-RP		UTAC41-TA		
3	POLICE 3		OPS 12		POLICE Car to Car		UTAC42-RP		UTAC42-TA		
4	POLICE 4		OPS 13				UTAC43-RP		UTAC43-TA		
5	POLICE 5		OPS 14				UTAC44-RP		UTAC44-TA		
6	POLICE 6		OPS 15				UTAC45-RP		UTAC45-TA		
7	POLICE 7		OPS 16				UTAC46-RP		UTAC46-TA		
8	POLICE 8		OPS 17				UTAC47A-RP		UTAC47A-TA		
9	POLICE 9		OPS 18				UTAC48A-RP		UTAC48A-TA		
10	POLICE 10		OPS 19				UTAC47D-RP		UTAC47D-TA		
11	POLICE 11		OPS 20				UTAC48D-RP		UTAC48D-TA		
12	POLICE 12		OPS 21				DynRgrp				
13	POLICE 13		OPS 22								
14	POLICE 14		OPS 23				PD Emergency*				
15	POLICE Direct		OPS 24				ALLCOM*				
16	MIRS1		OPS 25				MIRS1*		ALL-IOP		



CHANNEL LAYOUT (PAGE 2)

ZONE/BANK

ch.	PD Primary	TAC	State	NJ-PSIC-SW	NJ-PSIC-REG	Federal1	Federal2	Federal3	8TAC
1	Police D1	PS TAC1	7LAW11D	STATECALL1	UASI1	7GTAC57	7LAW61	7LAW61D	8CALL90-RP
2	Police D2	PS TAC2	7LAW12D	STATECOM2	UASI2	7AG58	7LAW62	7LAW62D	8CALL90-TA
3	Police D3	PS TAC3	7TAC11D	STATECOM3	UASI3	7AG60	7LAW81	7LAW81D	8TAC91-RP
4	Police D4	PS TAC4	7TAC12D	STATECOM4	UASI4	7AG67	7LAW82	7LAW82D	8TAC91-TA
5	Police D5	PS TAC5	7TAC15D	STATECOM5	UASI5	7TAC75	7CALL50	7CALL50D	8TAC92-RP
6	Police D6	PS TAC6		STATECOM6	UASI6	7TAC76	7CALL70	7CALL70D	8TAC92-TA
7	Police D7	PS TAC7		STATECOM7	USAR7	7GTAC77	7TAC51	7TAC51D	8TAC93-RP
8	Police D8	HWY/AIRPT		STATECOM8	USAR8		7TAC52	7TAC52D	8TAC93-TA
9	Police D9	Police TAC1		STATECOM9	HW INT I-80		7TAC53	7TAC53D	8TAC94-RP
10	Police D10	Police TAC2	7TAC21	STATECOM10	HW INT I-280	7GTAC57D	7TAC54	7TAC54D	8TAC94-TA
11	Police D11	Police TAC3	7TAC22	STATECOM11	HW INT I-78	7AG58D	7TAC55	7TAC55D	8TAC95-RP
12	Police D12	Police TAC4	7TAC23	STATECOM12	HW INT I-287	7AG60D	7TAC56	7TAC56D	8TAC95-TA
13	POLICE County	Police Secure1	7LAW21	STATECOM13	HW INT CMD N	7AG67D	7TAC71	7TAC71D	8TAC96-RP
14	POLICE SERT	Police Secure2	7LAW22	STATECOM14	HW INT OPS 1N	7TAC75D	7TAC72	7TAC72D	8TAC96-TA
15	POLICE DIRECT	Police Encrypted1	Police EMER	STATECOM15	HW INT OPS 2N	7TAC76D	7TAC73	7TAC73D	
16	MIRS700	Police Encrypted2	ALL RADIOS	REGROUP	HW INT OPS 3N	7GTAC77D	7TAC74	7TAC74D	



TALK GROUPS

- All Morris County trunked Channels are available at all Comm. Center consoles
- All repeated channels are recorded at the Comm. Center.
- Every unit is identifiable and any radio can be turned off remotely if lost or abused.
- Use Direct/local Channels for long messages and traffic not appropriate on the trunked system which transmits countywide.



COUNTY P25 PHASE II 700 MHz TRUNKING SYSTEM





WHAT IS TRUNKING?

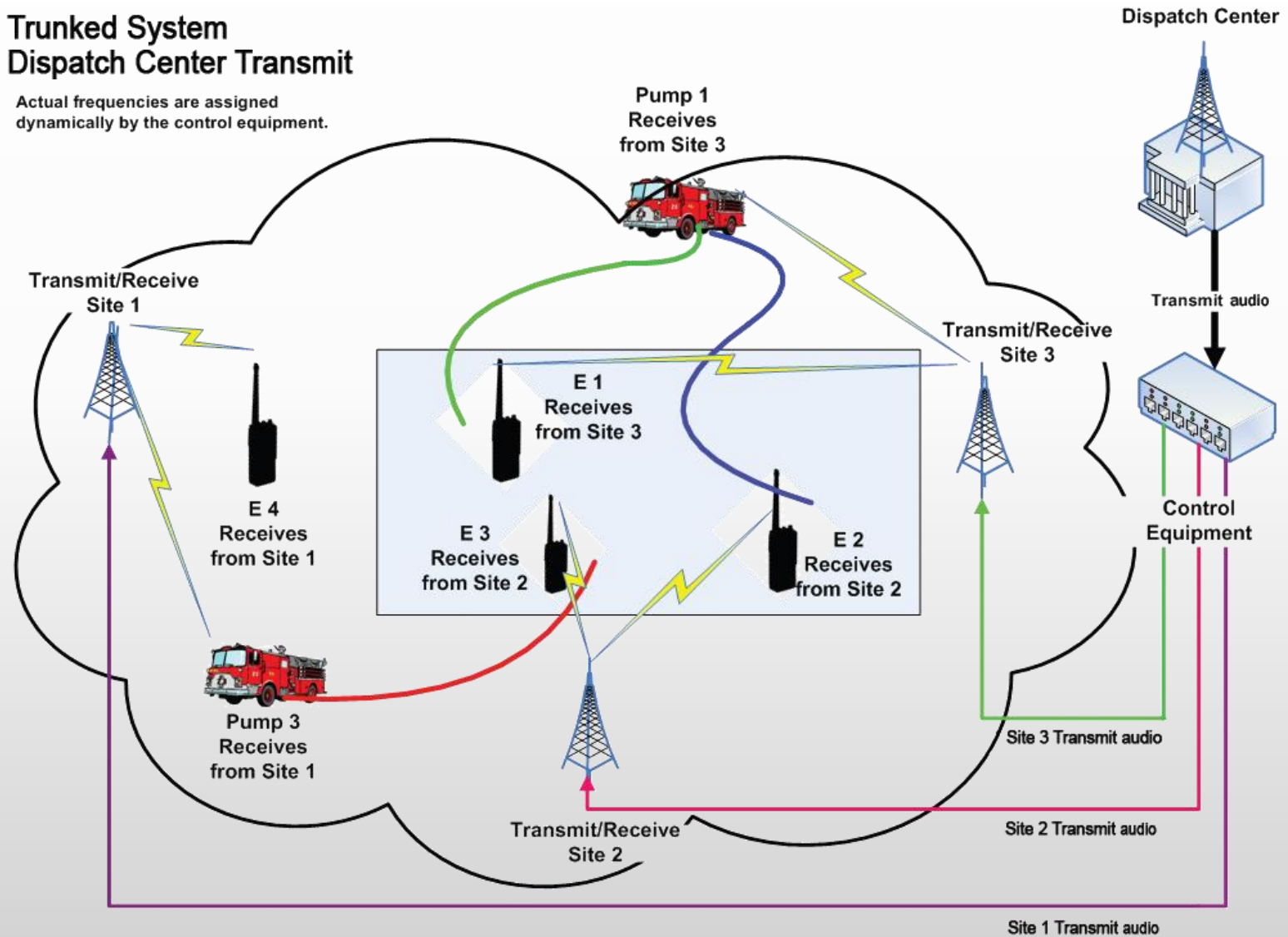
- Multiple frequencies available on a shared basis by all users
- Computer controlled - separates users by group
- System automatically picks the radio frequency, not the radio user, from the pool of frequencies available
- Allows for more efficient use of channels which allows greater number of users
- Presently over 5000 units sharing over 100 talkgroups



WHAT IS TRUNKING?

Trunked System Dispatch Center Transmit

Actual frequencies are assigned dynamically by the control equipment.





COUNTY RADIO SYSTEM

- 700 MHz Trunked Radio System supported by 14 repeaters throughout Morris County.
- ***On a repeated channel, if the dispatcher can hear you, everyone across the county can too! No need to have dispatcher relay information on the same channel.***
- All Morris County Police, Fire, and EMS emergency services have vehicle mounted radios
- Dispatch centers have interop capability (MIRS/TAC)
- ALL Morris County Fire Chiefs, EMS Rescue Captains & OEM Coordinators have been provided with compatible portable radios.
- ALL radio's are assigned, and may be disabled by Morris County Communication Center if the system is abused or used improperly.



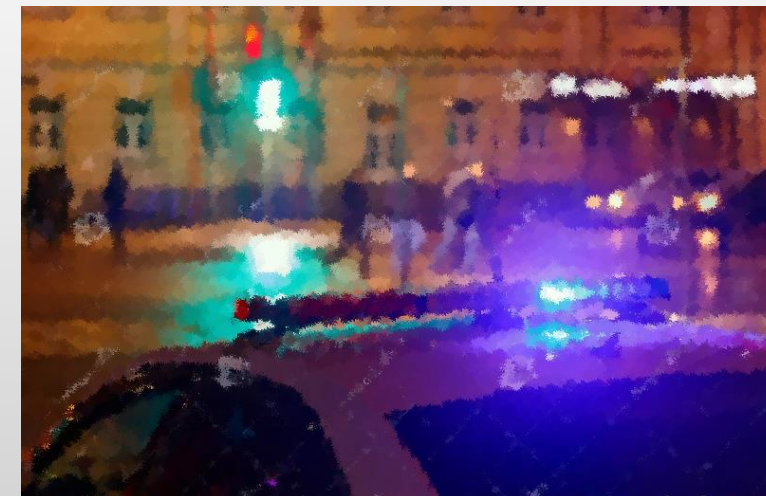
MUTUAL AID WITH OTHER SERVICES





MUTUAL AID RESPONSE

- Incidents can be assigned a PS TAC talkgroup by Comm. Center
- When responding as mutual aid, the IC will contact the host agency using the assigned radio talkgroup as requested by the host agency or assigned by the Morris County Comm. Center.
- Response to the County Comm. Center and initial direction can be done via “MIRS” talkgroup if not dispatched by Morris County
 - Mutual Aid should contact the Comm. Center on MIRS for assigned TAC channel when responding to mutual aid.
 - I.C. should contact the Comm. Center for channel assignment when requesting mutual aid, if different from normal.
 - Most times the dispatcher will assign a channel at the time of the call if different from your normal channel assignment





FOR FURTHER
ASSISTANCE



COMMUNICATIONS UNIT

Communications Unit Leader (COML) can be requested for major incidents or to help manage comms at a scene

- Prepares Incident Radio Communications Plan (ICS 205)
- Establishes Incident Communications Center (ICC)
- Orders and manages personnel, equipment
- Establishes needed capabilities
- Participates in incident action planning





COMMUNICATIONS UNIT

Can provide on-scene interoperability with disparate systems (i.e. out of county)



Can provide on-scene cache radios when needed or for special events





COMMUNICATIONS UNIT

- Questions? Comments? Suggestions?
- Contact Communications at 973-829-8190

